GENERAL REQUIREMENTS

MIL-STD-975M (NASA) - PART II

SECTION 21: ADVANCED MICROCIRCUIT PARTS LISTING(AMPL)

1.0 SCOPE

The Advanced Microcircuit Parts Listing (AMPL), contained in Section 21 of MIL-STD-975, lists advanced microcircuits as defined in paragraph 1.1. Parts listed in QML-38534 may also be listed in the AMPL, providing they meet the definition of paragraph 1.1 and they are not listed in MIL-STD-975 Part I. The parts listed in the AMPL are nonstandard and require the submittal of a Nonstandard Part Approval Request (NSPAR) for usage.

1.1 Definition of an Advanced Microcircuit. An advanced microcircuit is defined for the purposes of this standard as any device that meets one of the following characteristics:

a. A monolithic digital microcircuit:

(1) intended for use as a peripheral to a microcircuit, regardless of number of transistors, provided it is manufactured on the same production line using the same processes, or

(2) a monolithic digital microcircuit that combines two or more functions to forma more complex function and has 32 or more active pins exclusive of power, ground, and No (pin) Connects (NCs).

b. A monolithic memory microcircuit meeting any of the following criteria:

(1) Static RAM (SRAM) with 64 Kbits or more.

(2) Dynamic RAM (DRAM) with 1 Mbit or more.

(3) Fusible link PROM with 16 Kbits or more.

(4) EEPROM/EPROM with 256 Kbits or more.

(5) Specialized memory (FIFO, dual-port, etc.) with 4 Kbits or more.

c. A monolithic linear/analog microcircuit that combines two or more functions to form a more complex function and has 24 or more active pins exclusive of power, ground, and NCs.

d. Monolithic microprocessors with 8-bits or more; multiple application, Application Specific Integrated Circuits (ASICs).

e. A monolithic mixed-signal microcircuit (analog-to-digital, digital-to-analog, or resolver/synchro-to-digital converters) capable of handling 12 or more bits on the digital side.

f. A MultiChip or hybrid microcircuit that meets one or both of the following criteria:

(1) Contains at least one die meeting the monolithic microcircuit criteria defined in a, b, c, or d above.

(2) Contains three or more internally interconnected microcircuit die of any size and has 32 or more active pins exclusive of power, ground, and NCs.

1.2 **Requests for Adding Parts to the AMPL Listing.** Recommendations for addition of a part(s) to the AMPL shall be submitted in written form to:

AMPL Task Manager
Jet Propulsion Laboratory
M/S 303-208
4800 Oak Grove Drive
Pasadena, CA 91109-8099
FAX: (818) 393-4559

Submissions should include identification of the part (part number and description), manufacturer, and specification number. Information regarding the project and application for the part may also be included.

2.0 PART SPECIFICATIONS, PROCUREMENT, AND APPLICATION

2.1 **Part Specifications.** In order to be approved and listed in this standard, a part shall have a specification that defines physical design, material, quality, controls, test requirements, as well as performance and function over maximum operating ranges. The specification may be any one of the following types:

a. A NASA Detail Specification prepared in accordance with this document.

b. A qualified Manufacturer's List (QML) Standardized Military Drawing (SMD) prepared in accordance with MIL-I-38535 or MIL-H-38534.

c. A Source Control Drawing (SCD).

1.) An SCD is preferred that requires Wafer Lot Acceptance and at least the life test portion of lot acceptance testing. The life test portion consists of a Quality Conformance Inspection (QCI) or a Technology Conformance Inspection (TCI). Note that "B-Equivalent" devices do not require Wafer Lot Acceptance or either QCI or TCI.

2.) SCDs for the following class devices or equivalents will be reviewed and evaluated for listing in this standard:

MIL-STD-883 Non-JAN Class B ("B-Equivalent") or JPL Non-JAN Class S ("S-Equivalent")

MIL-H-38534 Classes H and K or "H-Equivalent" and "K-Equivalent"

MIL-I-38535 Classes "Q-Equivalent" and "V-Equivalent"

d. Vendor supplied specifications and screening flows with supporting data.

The SCD maybe prepared by a NASA Center, a NASA contractor, a contractor for military or commercial spacecraft systems, a vendor, or parts supplier.

2.2 **Procurement.** All parts listed herein shall be procured to the applicable detail specifications and shall be marked with a part number that signifies that the part meets all specification requirements. The "Ordering Data" paragraph of the detail specifications should be consulted to assure that proper information is listed in the purchase order or contract. In the event of a conflict between the technical description of a part in this listing and the applicable detail specification, the detail specification shall govern.

2.3 **Application.** The microcircuits listed herein must be properly applied by the acquiring activity in order to obtain satisfactory and reliable performance. When an application condition varies from the detail specification test condition(s), it shall be the responsibility of the acquiring activity to establish a satisfactory correlation between the circuit requirements and the detail part specification requirements.

3.0 AMPL PARTS LISTING CRITERIA

The criteria of paragraphs 3.1, 3.2, or 3.3 as applicable shall be met before an advanced microcircuit is approved and listed in this standard.

3.1 Listing Criteria for Parts with NASA Detail Specifications

3.1.1 **Vendor Validation.** The NASA AMPL preparing activity shall conduct an on-site vendor validation survey in the areas of fabrication, assembly and test, design, and organization, to verify the vendor's conformance to paragraphs 3.1.2 through 3.1.5. When the validation survey is scheduled, NPPO and the NASA center that requested the part shall be notified and invited to participate.

3.1.1.1 **Deficiency Correction Procedures.** If, during the initial vendor validation survey, the vendor is found to be deficient in any listing requirements, the vendor shall produce a plan for correcting these deficiencies. Two copies of this plan shall be provided by the manufacturer to the qualifying activity. If all deficiencies are not corrected and duly documented within six (6) months after the survey, the vendor shall not be listed on this standard and a new on-site validation survey shall be required before considering the parts for listing.

3.1.2 **Quality Assurance Program.** The manufacturer shall have a quality assurance program plan equivalent to that in MIL-I-38535, Appendix C or MIL-H-38534, Appendix A.

3.1.2.1 **Configuration Management and Traceability.** The vendor shall have a configuration management system in place to ensure traceability of all materials, procedures, and test information through the part serial number and date code.

3.1.2.2 **Field Failures.** The manufacturer shall have a documented procedure for logging and dispositioning of field failures returned by the customer, including the capability to perform failure analysis. Failure

analysis reports shall be made available to any acquiring activity upon request.

3.1.3 **Device Maturity.** The manufacturer shall have fabricated the product on a production line using proven materials and technology. The critical design and process parameters shall be identified and controlled.

3.1.4 **Characterization Data.** The AMPL validation team shall review characterization data from the manufacturer and any characterization data provided by NASA centers or other agencies. The data shall indicate the consistency of the part parameters when operating over the full temperature, voltage, and current ranges. Operation over the full military operating range is a goal and not a requirement.

3.1.5 **Qualification.** The part shall be qualified to Method 5005 of MIL-STD-883.

3.1.5.1 **Pending Qualification.** Parts may also be listed when qualification has not been completed. In such cases, an appropriate notation shall be included in the listing, indicating either that qualification is in process or under contract, or that the manufacturer shall qualify the part on the first lot of parts procured to the specification.

3.2 **Listing Criteria for Parts with QML SMDs**

3.2.1 **Qualified Manufacturer's List (QML).** Advanced microcircuits, as defined in paragraph 1.1 above, listed in QML-38534 shall be considered for inclusion in this listing, unless they are listed in Part I of MIL-STD-975.

3.2.2 **Vendor Validation.** The listing of the manufacturer in QML-38534 shall be considered evidence of the adequacy of the manufacturer's quality management program plan, capability to produce parts of suitable quality and reliability, and meeting of these criteria.

3.3 **Listing Criteria for Parts with Classes "B-, and "S-Equivalent" Specifications and SCDs**

3.3.1 **Vendor Validation.** The NASA AMPL preparing activity will validate the vendors' documentation to determine whether the parts meet MIL-STD-883 Classes "B-, and "S-Equivalent" screening requirements. Verification of the manufacturer's facilities and technical capabilities is the responsibility of the user.

3.3.2 **Qualification.** The NASA AMPL preparing activity will validate the vendor's documentation to determine whether the parts meet the equivalent requirements of MIL-STD-883 Method 5005, Classes S and B. Verification and review of vendor qualification data are the responsibility of the user.

4.0 LISTED PART REMOVAL CRITERIA

A part listed in this standard may be removed for any of the following reasons:

a. The part becomes obsolete.

b. There are no longer any qualified sources for the part.

c. The part is replaced with a functionally similar device having markedly improved characteristics or better reliability.

d. The part exhibits functionality or reliability problems.

e. Failure of the manufacturer to respond to a Government-Industry Data Exchange Program (GIDEP) Alert or to take corrective action.

4.1 **Problem Reporting.** The GIDEP Alert program provides a mechanism to report problems with part performance or reliability. If a user discovers a part problem that jeopardizes part quality and reliability, and notifies the AMPL Preparing Activity, the questionable part may be removed from the AMPL parts listing.

5.0 PART NUMBERING SYSTEM

The numbering system for NASA Detail Specifications follows the basic format of the SMD one part - one part number system. All parts bearing the NASA Specification part number shall be in full conformance with the applicable detail specification. The part number consists of two segments, the specification number and the part suffix. For paragraphs' 5.1 through 5.2.4, NA62-WWXXXZZSYY shall be used as an example part number.

5.1 **Specification Number.** The specification number consists of the first ten symbols in the part number. The specification number would therefore be NA62-WWXXX.

5.1.1 **Stock Class Designator.** NA indicates NASA and 62 are the last two digits of the federal stock class designator (5962). NA has been substituted for 59 to avoid conflict with numbers assigned by DESC.

5.1.2 **Radiation Hardness Designator.** The dash position indicates the radiation-hardness of the part. A dash means the part is not radiation-hard. If the part is assured to be radiation-hard, the following letters would take the place of the dash in the part number:

3	krad	M	100	krad	R
5	krad	N	200	krad	S
10	krad	D	300	krad	T
20	krad	E	500	krad	U
30	krad	F	1000	krad	H
50	krad	G			

5.1.3 **Drawing Number Year.** WW are the last two digits of the calendar year in which the drawing number was assigned.

5.1.4 **Drawing Number.** XXX is a sequential drawing number within the calendar year.

5.1.5 **Revision Letter.** Revisions to the specification are indicated by a sequential

revision letter. The revision letter is not a part of the part number.

5.2 **Part Number Suffix.** The part number suffix consists of the last five symbols in the part number. The part number suffix would therefore be ZZSYY.

5.2.1 **Type Number.** ZZ is the type number within the drawing.

5.2.2 **Class Designator.** S is the class designator (since the parts are "Class S-Equivalent").

5.2.3 **Package Designator.** The first Y is the package designator (case outline letters) in accordance with MIL-STD-835.

5.2.4 **Lead Finish Designator.** The second Y is the lead finish designator in accordance with MIL-I-38535, paragraph 3.7.2.